CUET (UG)

Biology Sample Paper - 10

Solved

Time Allowed: 45 minutes **Maximum Marks: 200**

General Instructions:

1. The test is of 45 Minutes duration.
2. The test contains 50 questions out of which 40 questions need to be attempted.
3. Marking Scheme of the test:

a. Correct answer or the most appropriate answer: Five marks (+5).
b. Any incorrectly marked option will be given minus one mark (-1).
c. Unanswered/Marked for Review will be given zero mark (0).

Attempt any 40 questions

1. Hydra reproduces asexually by: **[5]**

a) Budding
b) Fragmentation
c) Binary fission
d) Sporulation

2. Hibiscus flower is: **[5]**

a) Homosexual
b) Unisexual
c) Bisexual
d) Neuter

3. Grafting is an artificial vegetative propagation method, the portion to be grafted on the main part is called as: **[5]**

a) Adventitious bud
b) Scion
c) Stock
d) Stem

4. In a bacterium when RNA-polymerase binds to the promoter on a transcription unit during transcription, it **[5]**

a) terminates the process
b) inactivates the exons
c) helps remove introns
d) initiates the process

5. In some plants, diploid embryo sac develops directly from the diploid megaspore mother cell. This condition is called as: **[5]**

a) Microspory
b) Diplospory
c) Monospory
d) Megaspory

6. In nature, inbreeding, and outbreeding of plants are regulated by: **[5]**

a) Parthenogenesis
b) Maturation and hybridization
c) Duration of pollen and ovule formation
d) Intraspecific and interspecific incompatibility

7. Which one shows meiosis: **[5]**

a) Archesporium
b) Root tips
c) Anther
d) Pollen grain

8. In an analysis of a semen sample, it was observed that the total number of sperms was 18 million, of which 80% showed high motility and 20% shows less motility. How many sperms have a Y chromosome (approx.) **[5]**

a) 9 million
b) 12 million
c) 3.6 million
d) 6 million

9. Which of the following group of hormones are produced during pregnancy? **[5]**

a) Progestogenes, hPL and relaxin
b) HCG, HPL, and relaxin
c) Estrogens, HPL, and relaxin
d) hCG, estrogens, and relaxin

10. Given below are structural details of a human mammary gland: **[5]**

i. The glandular tissue in the breast has 15-20 clusters of cells called alveoli.
ii. The milk is stored in the lumen of alveoli.
iii. The alveoli join to form the mammary ducts.
iv. Mammary ampulla is connected to lactiferous ducts.

Choose the option that gives the correct detail of human mammary gland.

a) (i) and (iii)
b) (ii) and (iv)
c) (i) and (ii)
d) (ii) and (iii)

11. The cellular layer that disintegrates and regenerates again and again is: **[5]**

a) Endometrium of blood vessels
b) Dermis of skin
c) Endometrium of uterus
d) Cornea of eye

12. Oral contraceptives for the female containing non-steroidal preparation with very few side effects and high contraceptive value, “once a week pill”. **[5]**

a) Mala-D
b) Loveregen
c) Femilon
d) Saheli

13. Emergency contraceptives are effective if used within: **[5]**

a) 72 hrs of implantation
b) 72 hrs of menstruation
c) 72 hrs of ovulation
d) 72 hrs of coitus

14. Which of the following is a recessive trait of the garden pea plant? **[5]**

a) Inflated form of ripe pods
b) Terminal flower position
c) Purple flower colour
d) Green pod colour

15. Pedigree analysis is a study of particular traits in: **[5]**

a) Two species
b) Two families
c) Several generations
d) Two-generation only

16. When chromosome sets are present in multiple of 'n' the condition is called: **[5]**

a) Haploidy
b) Euploidy
c) Aneuploidy
d) Diploidy

17. The autosomal disorder/disease in humans is: **[5]**

a) Thalassemia
b) Haemophilia
c) Colour blindness
d) Turner's Syndrome

18. The best method to determine paternity is: **[5]**

a) Protein analysis
b) gene counting
c) chromosome counting
d) DNA fingerprinting

19. State the use of molecular genetics. **[5]**

a) Used to understand several diseases like Alzheimer's Parkinsons diseases, etc.
b) Used as gene therapy
c) Improves diagnosis of diseases
d) All of these

20. Who amongst the following scientists had no contribution in the development of the double helix model for the structure of DNA? **[5]**

a) Meselson and Stahl
b) Erwin Chargaff
c) Rosalind Franklin
d) Maurice Wilkins

21. Which one is used for knowing whether or not a population is evolving? **[5]**

a) Proportion between acquired variations
b) Genetic drift
c) Degree of evolution
d) Hardy Weinberg equation

22. Which of the following is used as an atmospheric pollution indicator? **[5]**

a) Lycopodium
b) Lichens
c) Lepidoptera
d) Lycopersicon

23. Natural selection is a process in which heritable variations enabling better survival are enabled to: **[5]**

a) Grow faster in a new habitat
b) Reproduce and leave a greater number of progeny
c) Grow slower in a new habitat
d) Reproduce and leaves less number of progeny

24. Viral infection can be treated by: **[5]**

a) Lymphocytes
b) Cry genes
c) Peptidases
d) Interferons

25. Withdrawal syndrome is characterized by: **[5]**

a) Anxiety, shakiness, nausea, and sweating
b) Headache, vomiting, and sweating
c) Shakiness, vomiting, and chills
d) High fever, sweating and vomiting

26. Select the pathogen mismatched with the symptoms of disease caused by it from the list given below: **[5]**

a) Entamoeba histolytica: Constipation, abdominal pain.
b) Wuchereria bancrofti: Chronic inflammation of lymphatic vessels of lower limb.

c) Epidermophyton: Dry scaly lesions on nail.

d) Haemophilus influenzae: Blockage of the intestinal passage.

27. Typhoid fever could be confirmed by: **[5]**

a) ECG

b) ELISA

c) Widal test

d) Western blot

28. Agricultural practices of breeding and raising livestock is called _____. **[5]**

a) Animal husbandry

b) Life Science

c) Apiculture

d) Biological strategies

29. An explant is: **[5]**

a) part of the plant used in tissue culture.

b) part of the plant.

c) part of the plant that expresses a specific gene.

d) a dead plant.

30. Norin-10 gene is famous for: **[5]**

a) Dwarfing effect

b) Gigas effect

c) Aromatic effect

d) Early maturation

31. Microorganisms that grow in milk and convert it to curd is commonly called **[5]**

a) Lactic acid bacteria

b) Curd bacteria

c) Lacto-bacteria

d) Milk bacteria

32. The organism which helps in the fermentation of Swiss cheese is: **[5]**

a) Lactobacillus

b) Cyclosporin

c) Yeast

d) Penicillin

33. Virus that kills bacteria are called: **[5]**

a) Macrophage

b) Saprophytes

c) Microphage

d) Bacteriophage

34. Which of the following samples of DNA in the table given below will give the desired result during polymerase chain reaction? **[5]**

a)

Sample	Temperature used for Denaturation	Enzyme used for extension
II	Low temp./50^{o}C	Heat stable

b)

Sample	Temperature used for Denaturation	Enzyme used for extension
I	High temp./90^{o}C	Heat stable

c)

Sample	Temperature used for Denaturation	Enzyme used for extension
III	Low temp./50^{o}C	Heat resistant

d)

Sample	Temperature used for Denaturation	Enzyme used for extension
IV	High temp./90^{o}C	Heat unstable

35. During agarose gel, electrophoresis DNA fragments move towards the anode. This is because: **[5]**

a) Anode is negatively charged
b) DNA moves in random direction
c) DNA is positively charged molecules
d) DNA is negatively charged molecules

36. Genetically modified DNA fragments are called: **[5]**

a) F DNA
b) Recombinant DNA
c) Mitochondrial DNA
d) S DNA

37. The abbreviation **Bt** in Bt Cotton stands for: **[1]**

a) Toxin released by Bacillus thuringiensis
b) Biotoxin
c) Biotechnology
d) Toxin released by insect

38. A probe is: **[1]**

a) Antibiotic resistant gene
b) Promoter
c) Complementary sequence of DNA
d) Radioactive substance

39. Exponential growth pattern in a population result into: **[5]**

a) Sigmoid curve
b) J-shaped curve

c) L-shaped curve
d) U-shaped curve

40. In 2005, for each of the 14 million people present in a country, 0.028 were born and 0.008 died during the year. Using exponential equation, the number of people present in 2015 is predicted as: **[5]**

a) 18 millions
b) 25 millions
c) 17 millions
d) 20 millions

41. The death rate, if 8 individuals in a laboratory population of 40 fruit flies died during a particular week will be: **[5]**

a) 0.4
b) 0.1
c) 0.3
d) 0.2

42. Transducers is the term used for: **[5]**

a) Herbivores
b) Decomposers
c) Green plants
d) Carnivores

43. The examples of local and global nutrient cycles will be: **[5]**

a) Carbon and phosphorus cycles respectively
b) Phosphorus and calcium cycles respectively
c) Carbon and nitrogen cycles respectively
d) Phosphorus and carbon cycles respectively

44. Secondary producers are **[5]**

a) Herbivores
b) Producers
c) None of these
d) Carnivores

45. In which of the following protected areas land patches will be permitted for grazing, plantation, and cultivation? **[5]**

a) Sanctuaries only
b) both Biosphere reserves & National parks
c) National parks only
d) Biosphere reserves only

46. Which one is known as the lungs of the planet? **[5]**

a) Amazon rain forest
b) All producers

c) Deciduous forest

d) All tropic rain forest

47. Cleanliness observed by human beings will adversely affect the habitats of: **[5]**

a) Decomposers

b) Scavengers

c) Secondary consumers

d) Detritivores

48. Ozone layer in upper atmosphere is being destroyed by **[5]**

a) Chlorofluorocarbon

b) Photochemical oxidants

c) Smog

d) SO_2

49. In which conference held in 1997, the rich nations have agreed to limit the emission of greenhouse gases. **[5]**

a) Montreal conference

b) Kyoto conference

c) Paris conference

d) Geneva conference

50. Which of the following will be able to cope with the greenhouse effect? **[5]**

a) Poikilotherms

b) Homeotherms

c) Stenotherms

d) Hibernators

Solutions

1. **(a)** Budding
   Explanation: In Hydra small outgrowth develops at the bottom side which grows into a bud. The well-developed buds detach from the parent body as new individuals.
2. **(c)** Bisexual
   Explanation: The flowers that contain both male and female reproductive organs in the same flower are called bisexual. In the Hibiscus flower, both stamen and carpel are present within the same flower.
3. **(b)** Scion
   Explanation: Artificial vegetative propagation is carried out by cutting, layering, and grafting. During the grafting root system of one plant and shoot system of other plants is joined together. The upper part is called scion and the lower part is called stock.
4. **(d)** initiates the process
   Explanation: initiates the process
5. **(b)** Diplospory
   Explanation: Megaspore mother cells are diploid, which generally undergo reduction division to produce megaspore but in some plants diploid megaspore mother cell directly produces diploid embryo sac this condition is called diplospory.
6. **(d)** Intraspecific and interspecific incompatibility
   Explanation: Inbreeding occurs in intraspecific flowers as contain the same kinds of genetic materials. Outbreeding takes place between interspecific flowers having different kinds of genetic materials.
7. **(c)** Anther
   Explanation: Anther produces pollen grains by the process of meiosis in which four microspores are produced by a single microspore mother cell. The number of chromosomes reduces to half.
8. **(a)** 9 million
   Explanation: Half the number of sperms have Y chromosomes and half have an X chromosome.
   Total number of sperms = 18 million
   So numbers of sperm having You chromosome = $\frac{18}{2}$ = 9 million
9. **(b)** HCG, HPL, and relaxin
   Explanation: Human chorionic gonadotropin (hCG), human placental lactogens (HCL), and relaxin are produced in human females only during pregnancy.

10. **(b)** (ii) and (iv)
Explanation: The milk is stored in the lumen of alveoli and Mammary ampulla is connected to lactiferous ducts.
11. **(c)** Endometrium of uterus
Explanation: The endometrium is the inner lining of the uterus which disintegrates and regenerates again and again during the menstrual cycle.
12. **(d)** Saheli
Explanation: Saheli is an oral contraceptive for the female containing non-steroidal preparation with very few side effects and high contraceptive value. It is once a week pill.
13. **(d)** 72 hrs of coitus
Explanation: Administration of progestogens or progestogen-estrogen combinations or IUDs within 72 hours of coitus has been found to be very effective as emergency contraceptives as they could be used to avoid possible pregnancy due to rape or casual unprotected intercourse.
14. **(b)** Terminal flower position
Explanation:

Trait	Dominant Expression	Recessive Expression
Form of ripe seed (R)	Smooth	Wrinkled
Color of seed albumen (Y)	Yellow	Green
Color of flower (P)	Purple	White
Form of ripe pods (I)	Inflated	Constricted
Color of unripe pods (G)	Green	Yellow
Position of flowers (A)	**Axial**	**Terminal**
Length of the stem (T)	Tall	Dwarf

15. **(c)** Several generations
Explanation: Pedigree analysis is the study of particular traits in several generations of a family. In this analysis, the inheritance of a particular trait is represented in a family tree over the generation.
16. **(b)** Euploidy
Explanation: Most of the organisms are diploid, contain two sets of chromosome (2n) but a number of organisms contain multiple of the chromosome set like 3n, 4n, 6n, etc. This condition of having multiple sets of chromosomes is called Euploidy.
17. **(a)** Thalassemia
Explanation: Thalassemia

18.

(d) DNA fingerprinting

Explanation: DNA paternity testing is the most accurate form of paternity testing possible. If DNA patterns between the child and the alleged father do not match on two or more DNA probes, then the alleged father can be totally ruled out. If the DNA patterns between mother, child, and the alleged father match on every DNA probe, the likelihood of paternity is 99.9 percent.

19.

(d) All of these

Explanation: The application of the power of molecular genetics to the problems of human disease plays an important role in many of the research programs in the Department of Biology.

Several complementary approaches are used by our research groups. The power of genomic analysis is used to identify, isolate, and characterize genes that cause and contribute to the etiology of human diseases.

Human disease is also studied through the functional analysis of key genes: low-density lipoprotein receptors in atherosclerosis and stroke; a broad spectrum of tumor suppressors and oncogenes in cancer, genes directly leading to the disease etiology in neuromuscular disorders such as Alzheimer's, Huntington's disease, and muscular dystrophies.

20. **(a)** Meselson and Stahl

Explanation: Meselson and Stahl made experiments to prove that mode of DNA replication is semi-conservative.

21.

(d) Hardy Weinberg equation

Explanation: Hardy-Weinberg equation is used to knowing whether or not a population is evolving or not. This equation is represented as $p^2 + 2pq + q2 = 1$.

In the equation, p^2 represents the frequency of the homozygous genotype AA, q^2 represents the frequency of the homozygous genotype aa, and 2pq represents the frequency of the heterozygous genotype Aa.

22.

(b) Lichens

Explanation: Lichens are a good pollution indicator as they do not grow in a polluted environment.

23.

(b) Reproduce and leave a greater number of progeny

Explanation: Natural selection is a process in which heritable variations enabling better survival are enabled to reproduce and leave a higher number of progeny in the habitat to increase in number faster than other species.

24.

(d) Interferons

Explanation: Interferons can be sued to treat the viral infection as interferon are proteins made and released by host cells in response to the presence of pathogens as viruses, bacteria, or tumor cells.

25. **(a)** Anxiety, shakiness, nausea, and sweating
Explanation: Withdrawal syndrome occurs in drug and alcohol addicted individuals who discontinue or reduce the use of their drug of choice. This process of eliminating drugs and alcohol from the body is known as detoxification. Anxiety, insomnia, nausea, perspiration, body aches, and tremors are just a few of the physical and psychological symptoms of drug and alcohol withdrawal that may occur during detoxification.
26. **(d)** Haemophilus influenzae: Blockage of the intestinal passage.
Explanation: Haemophilus influenzae: Hib causes a variety of diseases including meningitis (inflammation of the coverings of the spinal column and brain
27. **(c)** Widal test
Explanation: Widal test is a milestone invention in medicine. This test was devised by Frank Widal in 1896.
Widal test is the most widely used diagnostic test for typhoid fever in developing countries. The Widal test has been in use for more than a century as an aid in the diagnosis of typhoid fever. It measures agglutinating antibody levels against O and H antigens.
28. **(a)** Animal husbandry
Explanation: Animal husbandry is the agricultural practice of breeding, feeding, and raring of livestock to obtain animal products like milk, eggs, etc.
29. **(a)** part of the plant used in tissue culture.
Explanation: Explants are any part of a plant taken out and grown in a test tube, under sterile conditions in special nutrient media to regenerate the whole plant from it.
30. **(a)** Dwarfing effect
Explanation: Norin-10 gene is used to obtain dwarf varieties of crops like rice and wheat. This gene is introduced in crop plants by using the technique of genetic engineering.
31. **(a)** Lactic acid bacteria
Explanation: The micro-organisms that grow in milk and convert it to curd is commonly called lactic acid bacteria. Microorganisms such as Lactobacillus and others commonly called lactic acid bacteria (LAB).
32. **(c)** Yeast
Explanation: The propionibacterium (yeast) consumes the lactic acid that had been excreted by the other bacteria. Acetate, propionic acid, and carbon dioxide gas are all released. The acetate and the propionic acid give the flavor to the Swiss cheese and carbon dioxide creates bubbles and holes in the cheese.
33. **(d)** Bacteriophage
Explanation: Bacteria eating viruses are called Bacteriophage. Bacteriophage attaches to the body of bacteria and genetic material is transferred to bacteria where a lot of bacteriophages are produced.
34. **(b)**

Sample	Temperature used for Denaturation	Enzyme used for extension

I	High temp./90^{o}C	Heat stable

Explanation:

Sample	Temperature used for Denaturation	Enzyme used for extension
I	High temp./90^{o}C	Heat stable

35. **(d)** DNA is negatively charged molecules
Explanation: To separate DNA using agarose gel electrophoresis, the DNA is loaded into pre-cast wells in the gel and a current applied. The phosphate backbone of the DNA (and RNA) molecule is negatively charged, therefore when placed in an electric field, DNA fragments will migrate to the positively charged anode.

36. **(b)** Recombinant DNA
Explanation: Recombinant DNA is the general name for taking a piece of one DNA and combining it with another strand of DNA. Thus, the name recombinant! Recombinant DNA is also sometimes referred to as "chimera." By combining two or more different strands of DNA, scientists are able to create a new strand of DNA. The most common recombinant process involves combining the DNA of two different organisms.

37. **(a)** Toxin released by Bacillus thuringiensis
Explanation: Toxin released by Bacillus thuringiensis

38. **(c)** Complementary sequence of DNA
Explanation: A probe is a complementary sequence of DNA having radioactive particles. It is used in ELISA and other biotechnological investigations.

39. **(b)** J-shaped curve
Explanation: Exponential growth pattern in population results into a j-shaped curve. During exponential growth faster growth occurs and a j-shaped curve is formed when time v/s growth is drawn.

40. **(c)** 17 millions
Explanation: Growth rate = dN/dt =rN
r =Rate of nature increse
N = Size of original population
Using the equation expected polulation in 2015 = 17 millions

41. **(d)** 0.2
Explanation: Death rate of a population = $\frac{No.\ of\ individual\ died}{previous\ population}$
Here death rate = $\frac{8}{40}$ = 0.2
Hence, the death rate of fruit fly died is equal to 0.2.

42.

(c) Green plants

Explanation: Transducers are those organisms that convert one form of energy into another form. Green plants convert solar energy into chemical energy in foods by the process of photosynthesis.

43.

(d) Phosphorus and carbon cycles respectively

Explanation: The nutrient cycle describes the use, movement, and recycling of nutrients in the environment. Nutrient cycles are inclusive of both living and non-living components and involve biological, geological, and chemical processes. For this reason, these nutrient circuits are known as biogeochemical cycles.

Biogeochemical cycles can be broken down into two types: local cycles such as the phosphorus cycle, which involve elements with no mechanisms for long-distance transfer; and global cycles, which involve an interchange between the atmosphere and the ecosystem. It is these global nutrient cycles, such as the nitrogen cycle and carbon cycle, that unite the Earth and its living organisms into one giant interconnected ecosystem called the biosphere.

44.

(c) None of these

Explanation: Plants are the only producers. Thus, they are called primary producers. There are no other producers in a food chain. So the answer is none of these.

45.

(d) Biosphere reserves only

Explanation: The biosphere reserve is generally a vast protected area of land patches divided into three different zone, core, buffer, and transition zone. A transition zone May contain a variety of agricultural activities, grazing, plantation, cultivation, and settlements and other uses and in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests, and other stakeholders work together to manage and sustainably.

46. **(a)** Amazon rain forest

Explanation: The Amazon Rainforest, also known as Amazonia or Amazon Jungle, is one of the world's greatest natural resources and covers most of the Amazon Basin of South America.

Because its vegetation continuously recycles carbon dioxide into oxygen, it has been described as the "Lungs of our Planet". About 20% of earth's oxygen is produced by the Amazon rainforest.

47.

(b) Scavengers

Explanation: Scavenger feeds on dead animal and plant material present in the habitat. Cleanliness observed by human beings will adversely affect the habitat of the scavengers.

48. **(a)** Chlorofluorocarbon

Explanation: The ozone layer in the upper atmosphere is being destroyed by chlorofluorocarbon. CFCs break the molecular O_3 into O_2 and O. Thus a layer of ozone gets thinner and not able to prevent UV radiation.

49.

(b) Kyoto conference

Explanation:

- The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997.
- The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets.
- Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

50.

(b) Homeotherms

Explanation: Greenhouse effect causes an increase in temperature of earth.
Warm-blooded animal species can maintain a body temperature higher than their environment. In particular, homeothermic species maintain stable body temperature by regulating metabolic processes. The only known homeotherms are birds and mammals. Homeotherms can tolerate high temperatures. So, homeotherms will be able to cope with the effect of greenhouse effect.